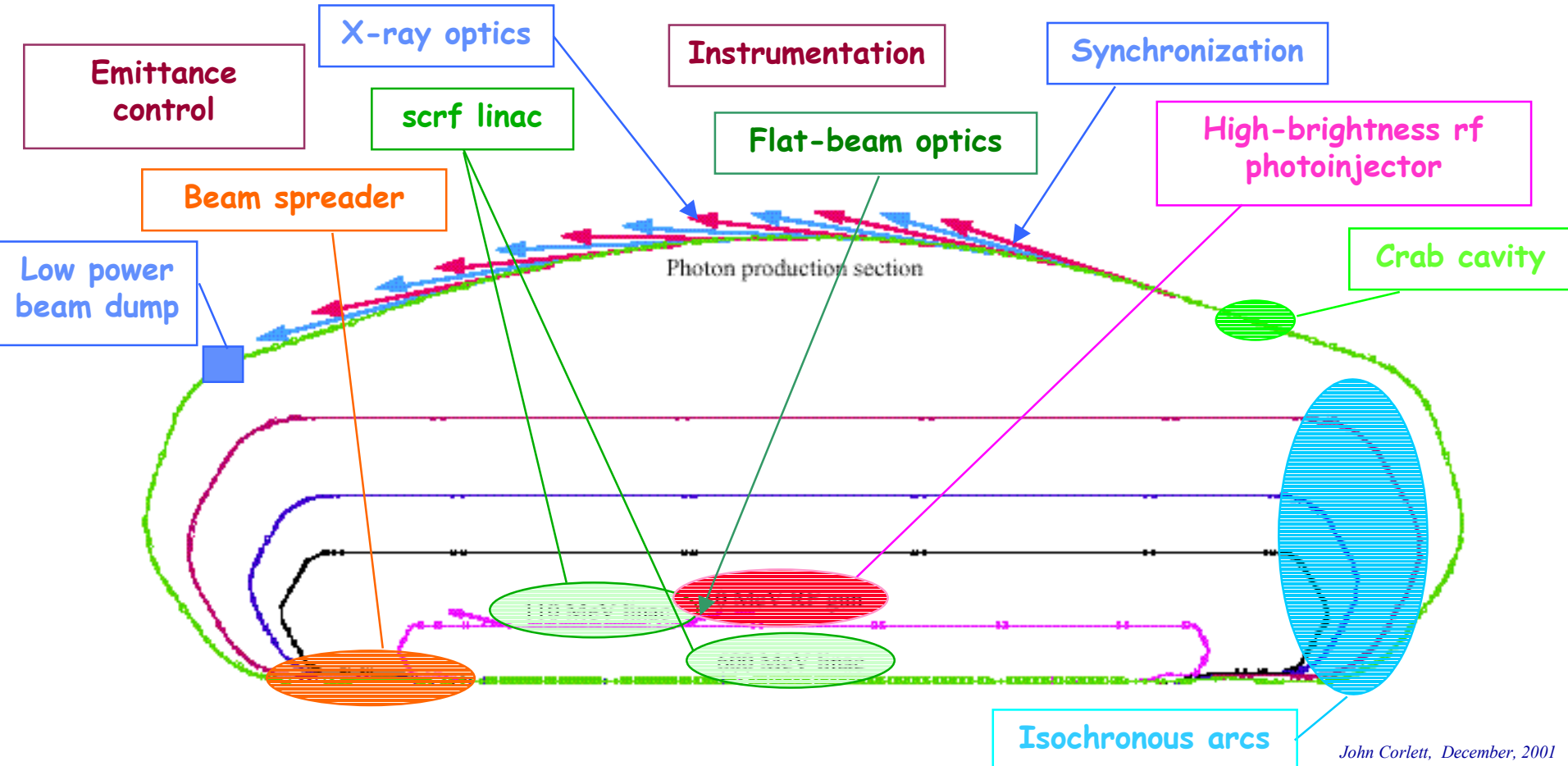
Recap and future plans

- Recirculating linac design appears feasible from our initial assessment
- We will develop feasibility studies in FY'02
  - Our view of key issues has been presented

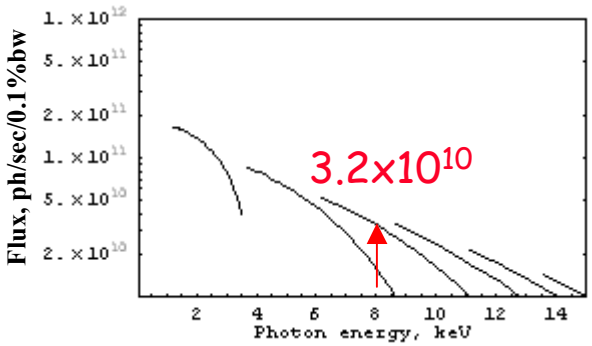


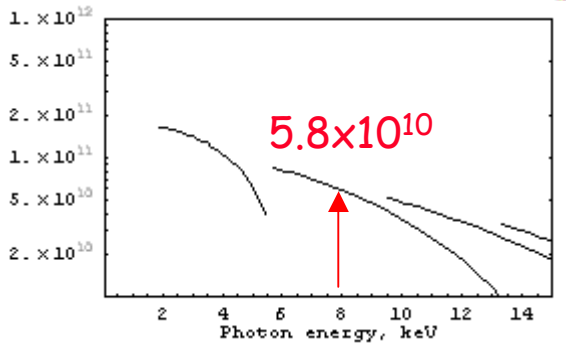
Upgrade paths

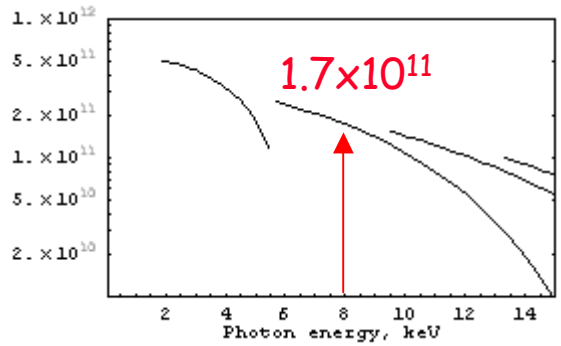
- **Baseline design**
  - 2.5 GeV
  - 1 nC
  - 1 mm-mrad

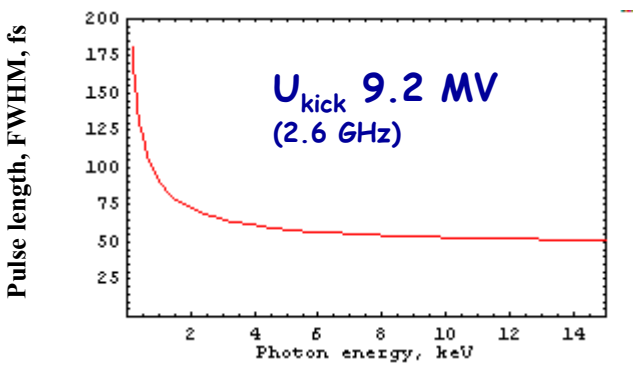
- **Increase energy**
  - 3.1 GeV
  - 1 nC
  - 1 mm-mrad

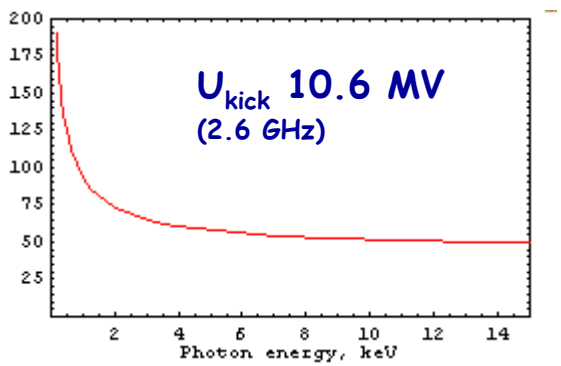
- **Increase charge**
  - 3.1 GeV
  - 3 nC
  - 3 mm-mrad

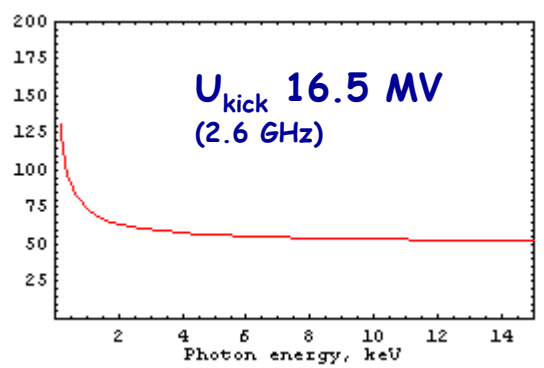












Upgrade paths contd.

Facility	Duration (fs)	Photons (pulse/ 0.1% BW)$^{-1}$	Average Flux (sec/ 0.1% BW)$^{-1}$	Rep rate (Hz)	Beamlines
LCLS - FEL	230	1.7×10^{12}	2×10^{14}	120	< 5
LCLS - spontaneous	230	1.3×10^{8}	1.6×10^{10}	120	< 5
SLAC SPPS	80	1×10^{8}	3.1×10^{9}	30	1
Femtosource	60	3.2×10^{6}	3.2×10^{10}	1×10^{4}	~ 20
ALS undulator	200	3×10^{2}	3×10^{6}	1×10^{4}	1

Increase energy to 3.1 GeV

- Additional linac module
- Higher gradient in linac
- Increased rf deflecting voltage

Femtosource	60	5.8×10^{6}	5.8×10^{10}	1×10^{4}	~ 20

Increase bunch charge to 3 nC

- Long-term gun R&D
- Increased rf deflecting voltage

Femtosource	60	1.7×10^{7}	1.7×10^{11}	1×10^{4}	~ 20

Increase ID length to 4 m

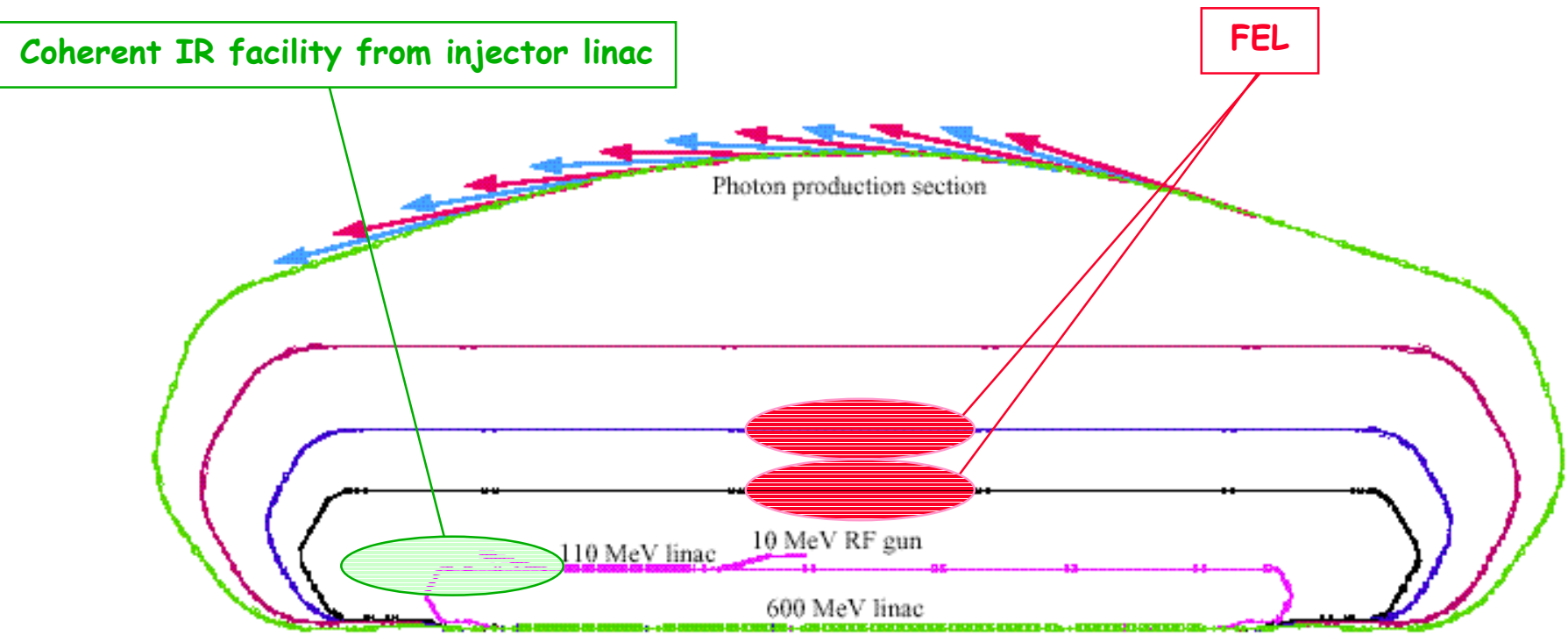
- Reduces # beamlines

Femtosource	60	2.5×10^{7}	2.5×10^{11}	1×10^{4}	~ 10

May also increase rep rate above 10 kHz

Future upgrade facilities

- High quality beam available from injector and in low energy arcs
- May make use of recirculated beam to increase flux in future facilities



Summary

- Key technologies and physics issues identified
  - "Conventional" accelerator techniques to produce fs pulses - *no "show-stoppers"*
  - R&D required to demonstrate some technology choices
  - Collaborations make good use of available resources and expertise developed elsewhere

- Cornell, TJNAF, BNL, SLAC all have light-source plans proceeding
  - Our plan is for a "niche", low-cost facility that complements other plans
  - Must work hard to remain a home institution for a future light source
    - Need high-level active involvement at LBNL Directorate / other institution / DOE level

- Additional resources needed to obtain CD0 level study
  - Need ~ 9 FTE effort from now to prepare for CD0 review
  - Additional resources to be identified
    - Commitment to 2 more years in-house funding